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ABSTRACT

This report describes the design and results of an experiment to test whether a $10.00 payment to participate in the national Health and Nutrition Examination Survey (HANES) would significantly increase the response rate for the survey. The design and findings of the study, as well as a comparison of response rates prior to and following implementation of renumberation in HANES, are also described. (Author)

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A Study of the Effect of Remuneration Upon Response in the Health and Nutrition Examination Survey

United States

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EDUCATION & WELFARE
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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

Health Resources Administration
National Center for Health Statistics
Rockville, Md. October 1975

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PREFACE

The Health and Nutrition Examination Survey (HANES) is a part of the U.S. National Health Survey conducted by the National Center for Health Statistics (NCHS). Prior to HANES, the examination response rates of three previous successive health examination surveys conducted by NCHS on 18-79, 6-11, and 12-17 year old segments of the U.S. population were very satisfactory. In the early stages of HANES, however, only 64 percent of the sample persons were examined, well below the minimum of 80 percent used as a planning factor. This factor was based on the experience of the past three surveys modified by a number of considerations. These considerations, all expected to depress the response rate, included:

- the differential sampling plan with respect to family income, sex, and age,
- the increased size and complexity of the program,
- the lesser appeal of a nutrition survey (compared with a health survey) as demonstrated by the experience of other nutrition surveys, and
- the worsening general climate of public attitudes towards surveys and towards the kinds of cooperation required in examination surveys.

In an effort to improve the response rate, it was proposed that remuneration be paid to the sample persons if they fully participated in the survey. This report describes a study conducted during HANES to test the effect of remuneration upon response. The design and findings of the study, as well as a comparison of response rates prior to and following implementation of remuneration in HANES, are also described.

The design and implementation of the study was a joint effort by the Division of Health Examination Statistics (DHES) and the Office of Statistical Methods (OSM). In addition to the authors of this report, other members of those two programs should be recognized for their participation. Dr. Saul Rosenberg, Mr. Kenneth Harris, and Ms. Jacqueline Kennedy of OSM made important contributions to the design and plan of the study and the preliminary analysis of results. Ms. Jean Findlay and Mr. Philip Howley, DHES, made important contributions to the field operation of the study and in the data preparation aspects.

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A STUDY OF THE EFFECT OF REMUNERATION UPON RESPONSE IN THE HEALTH AND NUTRITION EXAMINATION SURVEY

E. Earl Bryant, Mary Grace Kovar, and Henry Miller [a]

INTRODUCTION

The National Health Survey Act of 1956 provided for the establishment and continuation of a National Health Survey to obtain information about the health of the United States population. The responsibility is placed with the National Center for Health Statistics (NCHS), a research-oriented statistical organization within the Department of Health, Education, and Welfare. Three separate and distinct kinds of programs are employed by NCHS in meeting the objectives of the Act—household health interview surveys, surveys of health resources, and a health examination survey.[1]

The overall plan of the Health Examination Survey (HES) has been to conduct successive examination cycles for specific age segments of the civilian, noninstitutionalized U.S. population and, by means of medical and dental examinations, tests, and measurements, to characterize certain health aspects of the specified population. Between 1959 and 1970, three cycles were completed. The first cycle was a survey of adults aged 18 through 79 years;[2] the second, of children aged 6 through 11 years;[3] and the third, of youths aged 12 through 17 years.[4] Numerous methodological and analytical reports based on those three surveys have been published.

The fourth cycle of HES, which began in April 1971, was expanded to include a newly assigned responsibility for measuring and monitoring the nutritional status of the U.S. population. This cycle, referred to as the Health and Nutrition Examination Survey (HANES), was planned to serve a dual purpose. The first purpose was to measure the nutritional status of the U.S. population 1-74 years of age, and the second was to collect data on the health status and health care needs of the population 25-74 years of age.

The success of these surveys depends upon voluntary participation of individuals selected in the sample. For the first three cycles the participation was excellent; the examination response rates were 87, 96, and 90 percent, respectively. For HANES, however, it was apparent early in the survey that response rates were much lower than expected from experience in the previous cycles. After extensive efforts to improve interviewer techniques and to increase publicity and community involvement, the response rates remained low; only 64 percent of the 5,641 sample persons selected for the first 15 sites were examined (the rates at different sites ranged from 46 to 86 percent). Thus, other measures were required to improve the response rate.

It was hypothesized that response rates might be increased if an honorarium were paid to individuals who participated in the survey. Very little data from controlled experiments relating to this problem were available to support this hypothesis. Remuneration had been used extensively in mail surveys, but the amount of the honorarium had generally been small and the response rates so low that the results were not relevant. In house-

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hold interview surveys the results of paying respondents had been mixed. For example, Dohrenwend reported no difference in response rates when an honorarium of $5 was offered in 163 households in New York City.[5]

Because of the lack of conclusive evidence from previous studies, the decision to test the effects of remuneration in HANES was made. Although most surveys conducted by the Federal Government are based on unpaid, voluntary participation, it was reasoned that remuneration for participating in HANES could be justified because full participation in the survey requires several hours of the respondent's time and for many adults this means time lost from work, the need to pay a babysitter, or other inconveniences. Also, the cost of remuneration would result in some offsetting economies if the number of contacts required to obtain response could be reduced. However, even if the unit costs of the survey were increased by a $10 honorarium—the amount proposed for the study, the cost would be small compared with the importance of the total program if remuneration should increase the response rate to a satisfactory level.

Necessary clearances were submitted and plans were developed in November 1971 to institute a study of the effect of remuneration upon response. The earliest possible date that the study could be started was January 1972; at this time operations would be starting at three sites—Tucson, Arizona, West Palm Beach, Florida, and San Antonio, Texas. The last site was selected for two primary reasons—a sample size of about 600 persons as compared with 350 and 500 at the other two, and the fact that the San Antonio population was expected to be more typical of future HANES survey sites, particularly with respect to income and age distributions, than that of either Tucson or West Palm Beach.

This report describes the design and findings of that study. In addition, since remuneration was instituted in the succeeding part of the HANES survey, the report includes a comparison of response rates in the National survey before and after implementation of remuneration.

BACKGROUND OF HANES

Reports on the background, sample design, general plan, and operation of HANES[6] and all data collection forms of HANES[7] have been published. The sample design and procedures used in San Antonio were the same as those described in the reports except for the changes made specifically for the remuneration study procedures described in this report. So that the reader can understand how the remuneration study relates to the national survey, a brief description of the HANES sample design and survey procedures is presented.

HANES was similar to the three previous cycles of HES, in both general survey methodology and design. The examinations took place in specially built and equipped mobile examination centers consisting of three interconnected trailers. The staff of an examination center included physicians, dentists, nurses, laboratory and health technicians, and dietary interviewers. The sample was based on a highly stratified, multistage probability design which made it possible to produce National and regional estimates by various socioeconomic and demographic characteristics. The sample consisted of approximately 30,000 persons from 65 primary sampling units (PSU's), i.e., counties or groups of contiguous counties throughout the United States. The persons selected for the examination were chosen to make up a representative sample of the total population with oversampling of groups of persons with a high risk of malnutrition. In keeping with the dual purpose concept of HANES, a subset of persons aged 25-74 years received, in addition to the nutrition examination, a more detailed examination designed primarily to detect certain chronic diseases and to permit an assessment of unmet medical needs through comparing examination findings for several target conditions with the individual's self-perceived health needs and behavior.

The first contact with a sample household was made by a Bureau of the Census interviewer. At that time, a brief interview was conducted to determine the age and sex of each household member and to collect other demographic and socioeconomic information required for the survey. If no one was found at home after repeated calls, or if the household members refused to be interviewed, the interviewer tried to determine household composition from neighbors. The primary purpose for the data collected in this interview was to provide a framework for selecting a subsample of household members to receive the examination.

The next contact was made by a member of

the HANES staff, referred to as a Health Examination Representative (HER). The purpose of this visit was to administer a medical history questionnaire to the sample persons and to make appointments for the sample persons to be examined at the centrally located examination center. Intensive efforts were made during the 3-6 week duration of the survey in an area (the length of time depended on the number of people to be examined) to maximize the response rate. Call-backs were made to those who broke appointments as well as to those who had not made appointments at the time of the first visit by the HER.

EXPERIMENTAL DESIGN AND DATA COLLECTION

Experimental Design

The design for the study was superimposed upon the "within PSU" sample design of HANES for the San Antonio Standard Metropolitan Statistical Area. As such, that portion of the HANES design needs to be briefly described so that the experimental design can be understood.

Enumeration Districts (ED's) in each PSU were divided into segments of an expected six housing units each. Then a systematic sample of segments was selected. The number of segments selected for any particular PSU was based on a predetermined sample size of between 300 and 600 sample persons. The size was set by the PSU's population and the number of persons living in the ED's with median family income of less than $3,000. The ED's that fell into the sample as a result of the segment selection were then coded into two economic classes—median family income of less than $3,000 per year and $3,000 or more per year according to 1960 Bureau of the Census classifications. All sample segments in the low income ED's were retained in the sample. For those sample segments in the higher income ED's, the segments were divided into eight random subsamples and one of the subsamples was chosen to remain in the sample. The expected result of this sampling plan was that about a fourth of the sample persons would have family incomes of less than $3,000.

The initial sample in San Antonio consisted of 651 households; of these, 631 were interviewed by Bureau of Census interviewers. The 2,010 persons in the initial sample were listed by age and sex

Table A. Subsampling rates used in HANES

Age	Sex	Sampling rate
1-5 years	Both	1/2
6-19 years	Both	1/4
20-44 years	Male	1/4
20-44 years	Female	1/2
45-64 years	Both	1/4
65-74 years	Both	1/1

(information about the age and sex of the members of the 20 noninterviewed households was obtained from neighbors), and a systematic sample of 747 "eligible" persons was selected using the HANES sampling rates shown in table A. The final sample of 603 persons was determined by systematically deleting 144 persons from the eligible sample. This subsampling was necessary because a maximum of about 600 persons could be examined at any one site (maximum and minimum limits of 600 and 300 were set as part of the design). The final 603 sample persons came from 402 households in 138 segments. The first step in the experimental design was to classify the 138 segments by segment size (number of occupied households in segment) and by median family income, using the information that had been collected by the household interviewers. The segments were then sorted into seven size-income classes as shown in table B.

Table B. Distribution of segments by segment size and median family income

Number of occupied households in segment	Median annual family income for segment		
	Total	Less than $4,000	$4,000 or more
Total	138	44	94
1	57	14	15
2			28
3	39	15	24
4 or more	42	15	27

Segments were randomly paired within each cell. One segment of each pair was then randomly selected to have all of the sample persons in that segment told about the $10 remuneration. The other segment of the pair was selected to have none of the sample persons told. Note, however, that all persons who were examined received $10. The difference was that persons in the "Not told" segments did not know about the remuneration until they were at the examination center while those in the "Told" segments knew in advance of the examination. The decision to classify everyone in a particular segment as either "Told or "Not told" was made because it was felt that there might be communication between households within a segment and the "Not told" sample person would learn of the payment from a neighbor.

The pairs of segments were then randomly assigned to the HER's so that each interviewer's assignment consisted of a representative subsample of the segments.

An attempt was thus made to control three variables—income, interviewer, and segment size. Income was selected as a control variable because it was believed that an offer of $10 would influence persons with low income more than it would those with higher incomes. Interviewer assignments were selected because some interviewers are more successful than others in obtaining response in surveys. In HANES where the function of the HER's is to interview sample persons and to persuade them to come in for an examination, the interviewer's effect may be even more important than in a survey where the interviewer's function is only to obtain an interview. Segment size was selected as a control because of the possible interaction of the sample persons within segments and because the size of interview assignments had to be regulated as some of the interviewers could work for only 2 weeks in San Antonio before they had to report to another HANES examination site. Assigning too many sample persons to these interviewers would have made it impossible for them to complete their assignments.

Data Collection

The design and purpose of the study was thoroughly explained to the HER's before the HANES interviewing began. They were told that they must conduct the survey according to regular HANES procedures, except for the changes required for the study. The major difference between their usual routine and the experimental procedure was that they must tell all sample persons in the experimental segments about the remuneration. Under no circumstances were they to tell those in the control group about the $10 unless a person in a control segment had heard about remuneration and asked. Then, of course, he was told and that fact was recorded.

To assure a standard approach in the offer of remuneration, a statement was prepared and made part of the interviewer's introduction to the household. The statement read: "The United States Public Health Service is conducting a study on the health of the American people. The people chosen for the study are part of a carefully selected scientific sample, representative of all people in the United States. For the study to accurately picture the health of the Nation, we need your help. Today, I will ask some questions about your health and related matters. Then I would like to make an appointment for you to receive a free health examination at our special examination center. As an expression of appreciation for your help in this important survey, and as compensation for your time and inconvenience, you will receive a fee of $10 after the examination. Also, we will send any significant findings of the examination to the physician and dentist that you may want to designate." This statement was either read or paraphrased for each sample person in the experimental segments. If more than one family member was in the sample, the interviewer emphasized that each sample person would receive $10. For those in the control segments, the statement excluded the sentence about remuneration.

After the sample person had been examined, each was asked to complete an exit interview form. The primary purpose of the exit interview was to determine whether the sample person knew about the remuneration before coming to the examination center. A facsimile of the form is in appendix II.

In any experiment of this kind, it is inevitable that the design will not be followed exactly and problems will occur. One of the problems that did arise in this study resulted from the need to have interpreters accompany interviewers to approxi-

mately 10 percent of the households where no one could speak English. Some training was given to all the interpreters but they could not be randomly assigned and, consequently, the results are probably contaminated to some extent by interpreter effects.

A second problem arose because some of the HER's were not able to complete their assignments before leaving San Antonio. The goal had been to have the assigned interviewer complete at least the first contact with a sample person, attempt to make the examination appointment, and to offer remuneration if the sample person was in an experimental segment. At the end of the fourth week of the survey, four of the six interviewers had departed without completing the first contact with 109 sample persons; 50 in the experimental segments and 59 in the control segments. These sample persons were randomly reassigned to the two remaining interviewers.

Also, it was necessary to hire additional temporary interviewers near the end of the study to followup on persons who had broken appointments or who for other reasons had not been examined. However, these interviewers were well-trained, experienced interviewers and their assignments included similar proportions of sample persons from both experimental and control segments.

FINDINGS OF THE SAN ANTONIO STUDY

Examination Rates

Telling a sample person that he would be given $10 after being examined had a positive effect on the response rate in San Antonio. Among the 303 persons in the experimental segments who were contacted by the HER's, 82 percent were examined; among the 292 persons in the control segments who were contacted by the HER's, 70 percent were examined. (Eight persons whom the HER's were never able to contact are excluded from this analysis of examination rates.) The difference of 12 percentage points was statistically significant and was large enough to have an important implication for future HANES procedures.

The differences reported here are probably conservative since some persons were not told about remuneration even though they should have been and a few were told even though they should not have been. According to the records kept by interviewers, there were 10 errors of not telling people who should have been told and 4 errors of telling people who should not have been. According to answers given by those sample persons who filled out the Exit Interview questionnaire, as many as 20 percent of the experimental group may not have known or understood about remuneration, while 14 percent of those in the control group may have known. It is difficult, however, to evaluate the sample persons' responses to the Exit Interview because interpreters were not available and because there is internal evidence that the questions were not always understood. For example, when answering the question: "Before coming for the examination, were you told that you would receive payment as compensation for your time if you came?" one person answered "No" and then explained how he knew that he would receive $10.

The possible effects of this type of error should be kept in mind when interpreting the results in this report since all response rates were computed according to the original assignment of the segments.

Tables 1-6 provide a comparison of the response rates for the experimental and control groups for a number of subsets of the population according to age, sex, income group, and number of sample persons in a household. One notable observation is that the observed response rate was almost uniformly higher when renumeration was offered than when it was not; in only 3 of the 41 different (but not always mutually exclusive) subclasses shown in the tables was the observed difference zero or negative. Although some of the positive differences were small and consequently of little practical importance, more than half of them were 10 percentage points or larger.

To provide a more objective evaluation of a large number of positive response differences, consider the six mutually exclusive age-sex classes shown in table 1 where five of the differences are positive and one is zero. The probability of occurrence of this event by chance alone, assuming that there is no difference between the response rates of the control and experimental groups regardless of age or sex, is ${}_6C_1\,(\frac{1}{2})^6$ or about 9 in 100 trials. In table 2, all of the six income-age classes show positive differences, an

event which would occur by chance alone about 2 times in 100 trials.

Even stronger evidence of the existence of differences among population subgroups is the fact that most of the differences observed in the experimental study were also observed for succeeding stands of HANES where remuneration was routinely offered. This is discussed in the section "Implementation."

Because of the limited sample size for the experiment and the resulting small number of persons in subclasses of the sample, it is not possible to draw firm conclusions for most of the population subgroups when considered separately. Nevertheless, some knowledge about relationships can be gained by examining differences among the subgroups. The following analysis is based primarily on the normal deviate test, using the 0.05 level of significance. The test statistics are not exact since sampling errors were approximated using the procedure described in appendix I. The test is probably conservative, however, erring in terms of not rejecting the null hypothesis of no difference in response rates when in fact there is a difference.

Tables 1-3 show the number of sample persons, the proportion examined, and the difference between the "Told" and "Not told" groups for persons classified by age, sex, and family income group. These three variables are particularly important in the analysis of HANES data on nutrition. Reliable measures of the nutrition status of children, women in the childbearing years, and low-income persons are needed to design and evaluate programs aimed at improving the nutritional levels of these high-risk groups.

The examination rate for persons 1-19 years of age who were not told about remuneration was relatively high—83 percent (table 1.) The difference between that and the rate of 90 percent for persons in the same age group who were told was not significant. However, women in the childbearing ages (20-44 years) did show a significant difference in response rates with 90 percent responding in the "Told" group as compared with 65 percent of those who were not told about remuneration.

With respect to income (table 2), the examination rate for persons in a family with an annual income of $4,000 or more was significantly higher in the "Told" group (85 percent) than in the "Not told" group (72 percent). However, for persons in a family with an income of under $4,000 the difference between 78 percent in the "Told" group and 67 percent in the "Not told" group was not statistically significant. The lack of a significant difference between the two groups in this income class as contrasted with the higher income group may be due to the fact that there were only 214 persons in the lower income category as compared with 344 in the higher income category. With a smaller number of persons in the category, a difference must be larger before it can be detected by a statistical test

The lowest examination rate for any age sex class was that for women aged 45-74 (table 1). Being told that they would receive $10 after the examination had no detectable effect on the examination rates; only 56 percent of those told about remuneration were examined compared with 52 percent of those not told.

There may be many reasons why more of the older women did not respond. They may include fear or reluctance to be examined by a strange physician, fear of having certain physical conditions diagnosed, general bad health and already under rather intensive medical care, and reluctance to travel long distances in a taxi. Also, over half of these women (58 percent) were the only sample person in their household.

In addition to the three demographic variables of age, sex, and family income, which have been considered so far in this analysis, there is another variable, number of sample persons in the household, which may help to explain differences in response rates.

Because of the way the HANES sample is drawn—first a sample of segments and then a sample of persons listed in the households in those segments—it is possible to have one, two, or more sample persons in the same household. It seemed possible that the number of sample persons in the household might also have a positive influence on the examination or response rates. First, some sample persons might be less apprehensive about the trip to the examination center and the examination if they were in the company of another sample person from the same household. Second, the combined or total amount of remuneration available to a household with two or more sample persons might also have a positive effect on response.

The response rates by those variables are given in tables 4-6 and summarized in table C.

Among those persons not told about remuneration, 65 percent were examined when there was

Table C. Proportion of persons examined by remuneration status, according to number of sample persons in the household

Number of sample persons in household	Remuneration status			
	Total	Told	Not told	Difference
Total-----	.76	.82	.70	[1].12
One-----------	.67	.68	.65	.03
Two or more---	.82	.90	.74	[1].16
Difference----	[1].15	[1].22	.09	...

[1]Significant at the 5-percent level.

only one sample person from a household and 74 percent when there were two or more sample persons from the same household (table 4). The probability of a difference of this size or larger occurring by chance is about 0.75; thus the evidence of a real difference is relatively weak. Among those told about remuneration, 68 percent were examined when there was only one sample person from a household but 90 percent when there were two or more sample persons from the same household, a statistically significant difference of 22 percentage points.

The difference between the "Told" and "Not told" groups was not significant when there was only one sample person from a household but was statistically significant when there were two or more sample persons from the same household.

The differential response rates according to the number of sample persons in the household offers a possible explanation for the failure to detect a difference in rates for persons in low income households. As shown in table 6, differences between the "Told" and "Not told" groups were small (5 to 6 percentage points) and not significant when there was only one sample person, regardless of income class. For households with two or more sample persons, the estimated differences for both income classes were substantial, being 24 and 18 percentage points for the less than $4,000 and $4,000 or more classes, respectively. However, using the standard normal deviate test, even these large differences are not statistically significant.

In the study, 47 percent of the sample persons from households with family incomes of under $4,000 were one-sample-person households compared with 36 percent of those with family incomes of $4,000 or more. Thus, the amount of remuneration per household was more likely to be $10 per household in low income than in high income households.

Number of Contacts Made by HER's

The purpose of the remuneration study was to determine whether response rates would be changed by paying the sample persons to come to the examination center. The examination rates were improved, but it could have been possible, however, that other factors, such as more intensive followup among the "Told" group, may have accounted for the difference. As shown in table 7, this was clearly not true; the average number of contacts per sample person for each age, sex, and income category was almost identical for each group. Also, there is no evidence from the data recorded at the time of the study that different survey procedures were used for sample persons assigned to the two groups.

The final point to be investigated was whether there were any economies in terms of fewer contacts per examined person. If so, these factors would offset, at least to some extent, the cost of remuneration. Tables 8-10 provide some evidence that people are more cooperative and that less effort is required to obtain response when remuneration is offered.

Table 8 compares the proportion of persons making appointments at the first contact by HER's according to age, sex, and family income. Although none of the differences are statistically significant, the appointment rate was largest for each age, sex, and income class in the group told about remuneration. Table 9 shows that a larger proportion of the "Told" group kept their appointments than of the "Not told" group for each of the subclasses.

Possibly the strongest evidence that remuneration influences cooperation and thus reduces the number of contacts required to elicit response is shown in table 10. Only 2.1 sample person con-

tacts per examined person were required for the "Told" group as compared with 2.5 such contacts per examined person for the "Not told" group. This difference of 0.4 is statistically significant. Note also that the savings is apparent for each age, sex, and income class.

One interesting point which is not shown in the table is the amount of effort spent in trying to persuade women aged 45 years or older to come in for an examination. As discussed earlier, this group had a very low examination rate regardless of remuneration status, but it was not due to lack of effort. This group received 3.5 sample person contacts per examined person, in contrast to the 2.25 sample person contacts per examined person for the entire stand. Neither remuneration nor intensive effort had much effect in attracting these women.

IMPLEMENTATION

The findings of this study were considered sufficient to include remuneration as a routine procedure in the national survey. Remuneration of $10 per person examined was initiated simultaneously at the twenty-first (Avoyelles, Louisiana) and twenty-second (San Francisco, California) stands in the sequence of operations to cover the 65 stands scheduled for the survey. When the first 35 stands of the national survey had been completed, (excluding the San Antonio stand), 6,035 persons had been offered remuneration and 77.5 percent of them had been examined. This compares with 68.1 percent of the 7,335 persons interviewed when remuneration was not offered. Examination rates have been higher for each of the age-sex classes (table 11) and for each of the age-income classes (table 12) since remuneration has been a routine procedure in HANES. However, the inference from the San Antonio data that remuneration would be more effective with two or more sample persons in the household than with one has not been substantiated in the national survey (table 13).

It is not possible to assess just how much of this rather substantial response difference in the national survey can be attributed to remuneration since other factors not related to remuneration were also involved. Interviewer training continued throughout the survey, additional interviewers were added to the staff so that more intensive contacts were possible, and all survey procedures thought to affect response rates were improved as much as possible.

The preremuneration stands included a number of large metropolitan areas where, on the basis of experience in previous health examination surveys, examination rates were expected to be low. Data on population size are available, however, to compare the examination rates with and without remuneration according to population size of the areas surveyed (table 14). Regardless of the size of the population, examination rates were higher with remuneration than without; regardless of whether remuneration was offered or not, response rates were lowest in the areas with one million or more people.

Provisional response data for the 65 HANES stands show that of the 28,043 persons in the total sample, 20,749 or 74.0 percent were examined. During the last 30 stands, those in which remuneration was offered to all sample persons, the response rate was 76.4 percent. The overall response rate at the 45 stands where remuneration was offered in HANES (excluding San Antonio) was therefore 76.8 percent as compared to 68.1 percent for the 19 stands where remuneration was not offered.

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Table 1. Number of sample persons and proportion examined by remuneration status, according to sex and age: HANES Remuneration Study

Sex and age of sample person	Told		Not told		Difference
	Number in sample	Proportion examined	Number in sample	Proportion examined	
Both sexes, 1-74 years	303	.82	292	.70	[1].12
1-19 years	119	.90	110	.83	.07
20-44 years	85	.86	85	.67	[1].19
45-74 years	99	.69	97	.59	.10
Male, 1-74 years	129	.88	123	.74	.14
1-19 years	57	.95	55	.80	.15
20-44 years	27	.78	23	.74	.04
45-74 years	45	.84	45	.67	.17
Female, 1-74 years	174	.78	169	.67	.11
1-19 years	62	.85	55	.85	.00
20-44 years	58	.90	62	.65	[1].25
45-74 years	54	.56	52	.52	.04

[1]Significant at the 5-percent level.

Table 2. Number of sample persons and proportion examined by remuneration status, according to family income and age: HANES Remuneration Study

Family income and age of sample person	Told		Not told		Difference
	Number in sample	Proportion examined	Number in sample	Proportion examined	
All incomes, 1-74 years	303	.82	292	.70	[1].12
1-19 years	119	.90	110	.83	.07
20-44 years	85	.86	85	.67	[1].19
45-74 years	99	.69	97	.59	.10
Under $4,000, 1-74 years	115	.78	99	.67	.11
1-19 years	44	.93	35	.83	.10
20-44 years	25	.84	21	.67	.17
45-74 years	46	.60	43	.53	.07
$4,000 or more, 1-74 years	171	.85	173	.72	[1].15
1-19 years	68	.88	68	.82	.06
20-44 years	56	.88	58	.67	.21
45-74 years	47	.77	47	.62	.15
Unknown income, 1-74 years	17	.76	20	.75	.01

[1]Significant at the 5-percent level.

Table 3. Number of sample persons and proportion examined by remuneration status, according to family income and sex: HANES Remuneration Study

Family income and sex of sample person	Told		Not told		Difference
	Number in sample	Proportion examined	Number in sample	Proportion examined	
All incomes, both sexes-----	303	.82	292	.70	[1].12
Male-----	129	.88	123	.74	.14
Female-----	174	.78	169	.67	.11
Under $4,000, both sexes----	115	.78	99	.67	.11
Male-----	47	.87	38	.68	.19
Female-----	68	.72	61	.66	.06
$4,000 or more, both sexes--	171	.85	173	.72	[1].13
Male-----	74	.89	78	.77	.12
Female-----	97	.81	95	.67	.14
Unknown income-----	17	.76	20	.75	.01

[1]Significant at the 5-percent level.

Table 4. Number of sample persons and proportion examined by remuneration status, according to number of sample persons in household and age: HANES Remuneration Study

Number of sample persons in household and age of sample person	Told		Not told		Difference
	Number in sample	Proportion examined	Number in sample	Proportion examined	
All households, 1-74 years--	303	.82	292	.70	[1].12
1-19 years-----	119	.90	110	.83	.07
20-44 years-----	85	.86	85	.67	[1].19
45-74 years-----	99	.69	97	.59	.10
One sample person, 1-74 years-----	114	.68	125	.65	.03
1-19 years-----	40	.78	42	.74	.04
20-44 years-----	22	.68	30	.60	.08
45-74 years-----	52	.62	53	.60	.02
Two or more sample persons, 1-74 years-----	189	.90	167	.74	[1].16
1-19 years-----	79	.96	68	.88	.08
20-44 years-----	63	.92	55	.71	.21
45-74 years-----	47	.77	44	.57	.20

[1]Significant at the 5-percent level.

Table 5. Number of sample persons and proportion examined by remuneration status, according to number of sample persons in household and sex: HANES Remuneration Study

Number of sample persons in household and sex of sample person	Told		Not told		Difference
	Number in sample	Proportion examined	Number in sample	Proportion examined	
All households, both sexes--	303	.82	292	.70	[1].12
Male----------	129	.88	123	.74	.14
Female----------	174	.78	169	.67	.11
One sample person, both sexes----------	114	.68	125	.65	.03
Male----------	42	.83	52	.71	.12
Female----------	72	.60	73	.60	.00
Two or more sample persons, both sexes----------	189	.90	167	.74	[1].16
Male----------	87	.90	71	.76	.14
Female----------	102	.90	96	.73	.17

[1]Significant at the 5-percent level.

Table 6. Number of sample persons and proportion examined by remuneration status, according to number of sample persons in household and family income: HANES Remuneration Study

Number of sample persons in household and family income	Told		Not told		Difference
	Number in sample	Proportion examined	Number in sample	Proportion examined	
All households, all incomes[1]----------	286	.82	272	.70	[2].12
Under $4,000----------	115	.78	99	.67	[2].11
$4,000 or more----------	171	.85	173	.72	[2].13
One sample person, all incomes----------	109	.67	117	.67	.00
Under $4,000----------	48	.60	53	.66	-.06
$4,000 or more----------	61	.72	64	.67	.05
Two or more sample persons, all incomes----------	177	.92	155	.72	[2].20
Under $4,000----------	67	.91	46	.67	.24
$4,000 or more----------	110	.92	109	.74	.18

[1]Excludes 37 persons with unknown income.
[2]Significant at the 5-percent level.

Table 7. Number of sample persons and average number of HER contacts per person by remuneration status, according to age, sex, and family income: HANES Remuneration Study

Age, sex, and family income	Told		Not told	
	Number in sample	Contacts per person	Number in sample	Contacts per person
Total, 1-74 years	303	1.7	292	1.7
Age				
1-19 years	119	1.7	110	1.7
20-44 years	85	1.8	85	1.8
45-74 years	99	1.7	97	1.7
Sex				
Male	129	1.6	123	1.5
Female	174	1.8	169	1.9
Family income				
Under $4,000	115	1.6	99	1.7
$4,000 or more	171	1.7	173	1.8
Unknown	17	2.1	20	1.6

Table 8. Number of sample persons and proportion making appointment at first contact by remuneration status, according to age, sex, and family income: HANES Remuneration Study

Age and sex of sample person and family income	Told		Not told		Difference
	Number in sample	Proportion who made appointments at first contact	Number in sample	Proportion who made appointments at first contact	
Total, 1-74 years	303	.66	292	.61	.05
Age					
1-19 years	119	.69	110	.63	.06
20-44 years	85	.67	85	.66	.01
45-74 years	99	.63	97	.56	.07
Sex					
Male	129	.73	123	.71	.02
Female	174	.61	169	.54	.07
Family income					
Under $4,000	115	.73	99	.70	.08
$4,000 or more	171	.65	173	.56	.09
Unknown	17	.35	20	.65	-.30

Table 9. Number of sample persons and proportion examined after only one HER contact by remuneration status, according to age, sex, and family income: HANES Remuneration Study

Age and sex of sample person and family income	Told		Not told		Difference
	Number in sample	Proportion examined after one contact	Number in sample	Proportion examined after one contact	
Total, 1-74 years	303	.53	292	.44	.09
Age					
1-19 years	119	.59	110	.47	.12
20-44 years	85	.49	85	.42	.07
45-74 years	99	.51	97	.42	.09
Sex					
Male	129	.59	123	.54	.05
Female	174	.49	169	.37	.12
Family income					
Under $4,000	115	.55	99	.45	.10
$4,000 or more	171	.54	173	.43	.11
Unknown	7	.35	20	.50	-.15

Table 10. Number of examined persons and total sample person HER contacts per examined person by remuneration status, according to age, sex, and family income: HANES Remuneration Study

Age and sex of sample persons and family income	Told		Not told		Difference
	Number of examined persons	Contacts per examined person	Number of examined persons	Contacts per examined person	
Total, all examined persons	248	2.1	205	2.5	[1].4
Age					
1-19 years	107	1.9	91	2.1	.2
20-44 years	73	2.1	57	2.6	.5
45-74 years	68	2.5	57	2.9	.4
Sex					
Male	113	1.8	91	2.1	[1].3
Female	135	2.3	114	2.8	[1].5
Family Income					
Under $4,000	90	2.1	66	2.6	[1].5
$4,000 or more	145	2.1	124	2.5	[1].4
Unknown	13	2.1	15	2.1	.0

[1]Significant at the 5-percent level.

Table 11. Number of sample persons and proportion examined by whether remuneration was offered, according to sex and age: First 35 HANES stands (excluding San Antonio)

Sex and age of sample person	Offered remuneration		Not offered remuneration		Difference[1]
	Number in sample	Proportion examined	Number in sample	Proportion examined	
Both sexes, 1-74 years-----	6,035	.78	7,335	.68	.10
1-19 years----------	2,068	.86	2,471	.77	.09
20-44 years----------	1,959	.77	2,390	.65	.12
45-74 years----------	2,008	.70	2,474	.62	.08
Male, 1-74 years----------	2,548	.78	3,070	.69	.09
1-19 years----------	1,021	.86	1,228	.77	.09
20-44 years----------	584	.73	718	.62	.11
45-74 years----------	943	.74	1,124	.66	.08
Female, 1-74 years---------	3,487	.77	4,265	.67	.10
1-19 years----------	1,047	.86	1,243	.77	.09
20-44 years----------	1,375	.78	1,672	.66	.12
45-74 years----------	1,065	.67	1,350	.59	.08

[1]See appendix 1, page 20 for procedures to determine sampling errors.

Table 12. Number of sample persons and proportion examined by whether remuneration was offered, according to family income and age: First 35 HANES stands (excluding San Antonio)

Family income and age of sample person	Offered remuneration		Not offered remuneration		Difference[1]
	Number in sample	Proportion examined	Number in sample	Proportion examined	
All incomes, 1-74 years----	6,035	.78	7,335	.68	.09
1-19 years----------	2,068	.86	2,471	.77	.09
20-44 years----------	1,959	.77	2,390	.65	.12
45-74 years----------	2,008	.70	2,474	.62	.08
Under $4,000, 1-74 years---	1,408	.81	1,455	.68	.12
1-19 years----------	437	.90	384	.77	.14
20-44 years----------	291	.82	309	.61	.11
45-74 years----------	680	.74	762	.67	.07
$4,000 or more, 1-74 years----------	4,326	.78	5,406	.69	.08
1-19 years----------	1,558	.85	1,976	.78	.07
20-44 years----------	1,585	.76	1,929	.66	.10
45-74 years----------	1,183	.70	1,501	.62	.08
$4,000-$9,999, 1-74 years--	2,341	.76	2,917	.70	.07
1-19 years----------	835	.84	1,092	.78	.06
20-44 years----------	785	.76	950	.67	.09
45-74 years----------	721	.68	875	.63	.05
$10,000 or more, 1-74 years----------	1,985	.79	2,489	.69	.10
1-19 years----------	723	.85	884	.77	.08
20-44 years----------	800	.76	979	.66	.10
45-74 years----------	462	.73	626	.60	.13
Unknown income, 1-74 years----------	301	.62	474	.54	.09

[1]See appendix I, page 20 for procedures to determine sampling errors.

Table 13. Number of sample persons and proportion examined by whether remuneration was offered, according to number of sample persons in household and age: First 35 HANES stands (excluding San Antonio)

Number of sample persons in household and age of sample person	Offered remuneration		Not offered remuneration		Difference[1]
	Number in sample	Proportion examined	Number in sample	Proportion examined	
All numbers, 1-74 years---	6,035	.78	7,335	.68	.10
1-19 years----------	2,068	.86	2,471	.77	.09
20-44 years----------	1,959	.77	2,390	.65	.12
45-74 years----------	2,008	.70	2,474	.62	.08
One sample person, 1-74 years----------	2,564	.75	3,237	.67	.08
1-19 years----------	636	.86	788	.80	.06
20-44 years----------	747	.74	919	.64	.10
45-74 years----------	1,181	.71	1,530	.62	.09
Two or more sample persons, 1-74 years---------	3,464	.79	4,090	.69	.10
1-19 years----------	1,430	.85	1,682	.76	.09
20-44 years----------	1,208	.78	1,465	.66	.12
45-74 years----------	826	.69	943	.62	.07
Unknown number of sample persons----------	7	.57	8	.12	.45

[1]See appendix I, page 20 for procedures to determine sampling errors.

Table 14. Number of sample persons and proportion examined by whether remuneration was offered, according to population of areas in survey: First 35 HANES stands (excluding San Antonio)

Population of areas in survey	Offered remuneration		Not offered remuneration		Difference[1]
	Number in sample	Proportion examined	Number in sample	Proportion examined	
Total----------	6,035	.78	7,335	.68	.09
One million or more----------	2,631	.70	2,929	.62	.08
Other urbanized areas----------	436	.76	1,712	.71	.06
Urban places----------	755	.85	780	.73	.12
Rural----------	2,213	.84	1,914	.73	.11

[1]See appendix I, page 20 for procedures to determine sampling errors.

APPENDIX I

TECHNICAL NOTES ON METHODS

General Qualifications

The Remuneration Study was based on a sample of 603 persons who had been selected from the San Antonio SMSA as part of the National Health and Nutrition Examination Survey (HANES) sample. The purpose of the experiment was to determine if an offer of $10 would influence one's willingness to participate in HANES.

The analysis presented in the report is based largely on normal deviate tests of hypotheses. The estimator for sampling errors required for the analysis assumes a two-stage, stratified cluster design, whereby a simple random sample of segments of about six households each was selected independently from seven size-income classes; within segments, a random sample of people was selected. These assumptions deviate somewhat from the actual design. Poststratification was used rather than the assumed prestratification, households rather than persons were chosen at the second stage of selection, and differential sampling rates were used in sample selection within age, sex, and income classes. The effect of these assumptions probably results in an underestimate of variance.

On the other hand, there is a component of variance due to interviewers that is not fully reflected in the variance estimates and because of the way the study was carried out, it is not possible to obtain an accurate estimate of the interviewer variance. However, since each interviewer was initially assigned a random sample of segments which had been randomly paired by experimental procedure, the interviewer's effect on the difference in response rates for the two experimental groups should be minimized.

Estimation Procedure

Let P'_A = response rate for experimental procedure A.

P'_B = response rate for control procedure B.

$$P'_A = \sum_{i=1}^{7} \frac{n_{Ai}}{n_A} P'_{Ai}$$

$$P'_B = \sum_{i=1}^{7} \frac{n_{Bi}}{n_B} P'_{Bi}$$

n_{Ai} = number of sample persons in stratum i who are assigned to procedure A.

n_A = total number of sample persons assigned to procedure A.

P'_{Ai} = response rate in ith stratum among people assigned to procedure

$$A = \frac{1}{n_{Ai}} \sum_{j=1}^{7} X_{Aij}$$

n_{Bi}, n_B and P'_{Bi} are defined similarly for procedure B.

Sampling Errors

Variance estimator for response rates.—Assuming the n's are fixed constants as they would be for prestratification,

$$\sigma^2_{P'_A} = \sum_{i=1}^{7} \left(\frac{n_{Ai}}{n_A}\right)^2 \sigma^2_{P'_{Ai}}$$

$$\sigma^2_{P'_B} = \sum_{i=1}^{7} \left(\frac{n_{Bi}}{n_B}\right)^2 \sigma^2_{P'_{Bi}}$$

The variance of P'_{Ai} (and P'_{Bi}) have two components—between segments and within segments—as follows:

$$\sigma^2_{P'_{Ai}} \doteq \frac{s^2_{AiB}}{m_{Ai}} + \sum_{j=1}^{m_{Ai}} \left(\frac{n_{aij}}{n_{ai}}\right)^2 \frac{P'_{Aij} Q'_{Aij}}{n_{aij}}$$

where

$$s^2_{A_i p} = \sum_{j=1}^{m_{A_i}} \frac{(P_{A_{ij}} - P_{A_i})^2}{m_{A_i} - 1}$$

The undefined terms in the equation are:

$n_{A_{ij}}$ = number of sample persons assigned to procedure A in ith stratum in jth segment.

$P_{A_{ij}}$ = response rate in jth segment of ith stratum among persons assigned to procedure A.

$$Q_{A_{ij}} = 1 - P_{A_{ij}}$$

m_{A_i} = number of segments assigned to procedure A in ith stratum.

The variance estimator for P_{B_i} has the same form.

Variance of difference, $D' = P'_A - P'_B$.—In general, the variance of the difference between two random variables is:

$$\sigma^2_{D'} = \sigma^2_{P'_A} + \sigma^2_{P'_B} - 2\sigma_{P'_A P'_B}$$

For this study, the covariance term in the above equation is considered to be zero. For most variables presented in the report, the assumption is probably close to the truth. The response rates for the two experimental groups should be nearly independent since segments (clusters of households) were randomly assigned to the two procedures. There may be some interaction between the two groups, however, due primarily to interviewer effects, since interviewer assignments included both experimental and control households. Neither the magnitude nor direction of the difference is known, but our speculation is that the effect is relatively small and positively correlated. If this is true, then $\sigma^2_{D'} = \sigma^2_{P'_A} + \sigma^2_{P'_B}$ is an overestimate of the variance.

Variance estimator for estimates of number of visits (or contacts).—Let $\bar{X}'_{A_i}$ = average number of contacts per person in procedure A, stratum i.

$X'_{A_{ij}}$ = average number of contacts per person in procedure A, stratum i, segment j.

$X_{A_{ijk}}$ = number of contacts for kth person in segment j, stratum i, procedure A.

Then the variance estimator for $\bar{X}'_{A_i}$ is approximately

$$s^2_{\bar{X}'_{A_i}} = \sum_{j=1}^{m_{A_i}} \frac{(X'_{A_{ij}} - \bar{X}'_{A_i})^2}{m_{A_i}(m_{A_i} - 1)} + \frac{1}{m_{A_i}} \left[\sum_{j=1}^{m_{A_i}} \sum_{k=1}^{n_{A_{ij}}} \frac{(X_{A_{ijk}} - X'_{A_{ij}})^2}{n_{A_{ij}}(n_{A_{ij}} - 1)} \right]$$

The variance estimator for $\bar{X}'_B$ is the same as $\bar{X}'_A$ except that estimates for the procedure B sample replace those for procedure A.

$$\sigma^2_{\bar{X}'_A} = \sum_{i=1}^{I} \left(\frac{n_{A_i}}{n_A} \right)^2 \sigma^2_{\bar{X}'_{A_i}}$$

$$\sigma^2_{\bar{X}'_B} = \sum_{i=1}^{I} \left(\frac{n_{B_i}}{n_B} \right)^2 \sigma^2_{\bar{X}'_{B_i}}$$

$$\sigma^2_{(\bar{X}'_A - \bar{X}'_B)} = \sigma^2_{\bar{X}'_A} + \sigma^2_{\bar{X}'_B}$$

Presentation of variances (San Antonio study and HANES).—Because of scarce resources it was not feasible to compute variances for every statistic shown in this report. Instead, sampling variances were computed only for a few key statistics as indicated in tables I and II. Sampling errors for other estimated response rates shown in the report were approximated by use of the "design effects" (DEFF'S) shown in the tables.

To determine the approximate sampling variance of an estimated response rate for either the Remuneration Study or for the entire HANES, the following formula can be used:

$$\sigma^2_{P'} = \frac{(DEFF)^2 P'(1 - P')}{n}$$ where

P' = response rate and

n = sample size for the class in which the response rate applies.

The variance estimator of the difference between response rates is as follows:

$$\sigma^2_{P'_A - P'_B} = \frac{(DEFF)^2_A P'_A (1 - P'_A)}{n_A} + \frac{(DEFF)^2_B P'_B (1 - P'_B)}{n_B}$$

Table I. Sampling errors and design effects for response rates, by remuneration status and selected population characteristics

Characteristic	Told			Not told		
	Response rate	Sampling error of rate	Design effect	Response rate	Sampling error of rate	Design effect
Total, 1-74 years	.82	.035	1.6	.70	.038	1.4
1-19 years	.90	.069	2.5	.83	.047	1.3
20-44 years	.86	.068	1.8	.67	.066	1.3
Female, 1-74 years	.78	.047	1.5	.67	.047	1.3
Female, 20-44 years	.90	.071	1.8	.65	.073	1.2
Two or more sample persons in the household:						
1-19 years	.96	.086	3.9	.88	.076	1.9
20-44 years	.92	.089	2.6	.71	.073	1.2
45-74 years	.77	.087	1.4	.57	.079	1.1
Female, 1-74 years	.90	.071	2.4	.73	.068	1.5
Family income under $4,000	.78	.058	1.5	.67	.066	1.4

Table II. Sampling errors and design effects for number of contacts per examined person, by remuneration status and selected population characteristics

Characteristic	Told			Not told		
	Contacts per examined person	Sampling error	Design effect	Contacts per examined person	Sampling error	Design effect
Total, 1-74 years	2.1	.101	1.8	2.5	.101	1.8
1-19 years	1.9	.139	1.6	2.1	.129	1.4
20-44 years	2.1	.180	1.5	2.6	.146	1.4
Female, 1-74 years	2.3	.136	1.6	2.8	.123	1.5
Family income under $4,000	2.1	.161	2.1	2.6	.142	1.6

APPENDIX II

FORMS AND QUESTIONNAIRES

Appointment Form

APPOINTMENT FOR (name)	SAMPLE NO.	SEGMENT	SERIAL	COLUMN

DATE AND TIME OF APPOINTMENT

DAY OF WEEK	DATE	TIME

NAME AND ADDRESS

TELEPHONE:

TRANSPORTATION:
☐ BY PHS AGENT ☐ TAXI ☐ BY SELF

ADDITIONAL INFORMATION

CALL NO.	HER	DATE	TIME IN	TIME OUT	PERSON CONTACTED	RESULT
1						
2						
3						
4						
5						
6						

REMARKS

RECORD OF CALLS

Exit Interview Form

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Health and Nutrition Examination Survey

_____
Sample Number

NAME: _____ _____ _____
(LAST) (FIRST) (MI)

Now that you've finished your health examination, we would appreciate some of your opinions about it. This will help us learn how we can improve the survey.

1. Were there any parts of the examination which you did not like for any reason?

   ☐ Yes ☐ No If Yes, which parts? _____

2. Do you feel that the examination was too long? ☐ Yes ☐ No

3. Did you take time off from work to come? ☐ Yes ☐ No

4. Did you have any problems, worries, or reluctance about coming for this examination?

   ☐ Yes ☐ No If yes, what were they? _____

5. Before coming for the examination, did you know that you would receive payment as compensation for your time if you came?

   ☐ Yes ☐ No

   If Yes: A. By Whom?
   - ☐ One of our representatives
   - ☐ A neighbor or friend
   - ☐ Somebody else - Who? _____

   B. If you had not known you would be compensated, would you have come for the examination?
   - ☐ Yes
   - ☐ No

6. Is there anything else you would like to tell us about the examination?

   _____

   _____

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